

WHAT IS CLAIMED IS:

1. An automotive radio wave radar in which a radio wave is radiated from a transmit antenna forward of a relevant vehicle, a reflected radio wave from a vehicle running ahead or other object is received by a receive antenna, and at least a position or a rate of the vehicle running ahead relative to the relevant vehicle is computed, said radar comprising:

oscillation means for oscillating a radio wave to be transmitted while changing a frequency of the transmitted radio wave at a certain time interval; and

signal processing means for detecting an abnormality of a received signal based on signals obtained by receiving radio waves transmitted at different frequencies.

2. An automotive radio wave radar according to Claim 1, wherein said radar is of the type radiating a radio wave modulated about a certain center frequency from said transmit antenna,

said oscillation means oscillates the radio wave to be transmitted while changing a center frequency of the transmitted radio wave to different frequencies at a certain time interval; and

signal processing means computes position information of the vehicle running ahead for each of the center frequencies of the radio waves transmitted from said oscillation means.

3. An automotive radio wave radar according to Claim 2, wherein said signal processing means executes decision by majority on the position information computed for at least three or more center frequencies, and when mismatching position information is computed with the occurrence of any jamming, determines the position information, which has been decided to be minority with the decision by majority, to be an abnormal value and discards the abnormal value.

4. An automotive radio wave radar according to Claim 1, wherein said radar is of the type radiating a radio wave modulated about a certain center frequency from said transmit antenna,

said oscillation means oscillates the radio wave to be transmitted while changing a center frequency of the transmitted radio wave to different frequencies at a certain time interval; and

signal processing means computes spectra from intermediate frequency signals resulting from down-converting received reflected radio waves of at least three or more center frequencies by a mixer, and when a part or the whole of at least one of the computed spectra is determined to have a different waveform with the occurrence of any jamming, determines the at least one spectrum to be abnormal and discards the abnormal spectrum.

5. An automotive radio wave radar according to Claim 1,

wherein said radar is a 2-frequency CW (Continuous Wave) radar in which radio waves of two different frequencies are alternately radiated forward of the relevant vehicle, reflected radio waves from the vehicle running ahead are received by said receive antenna, and information of a range relative to the vehicle running ahead is computed from a phase difference between the received radio waves of the two frequencies.

6. An automotive radio wave radar according to Claim 1, wherein said radar is an FMCW (Frequency Modulated Continuous Wave) radar for transmitting a radio wave while performing frequency modulation to change a frequency of the transmitted radio wave in a predetermined pattern with time.

7. An automotive radio wave radar according to Claim 1, wherein said radar is a 2-frequency CW (Continuous Wave) automotive radio wave radar in which radio waves of two different frequencies are alternately radiated forward of the relevant vehicle, reflected radio waves from the vehicle running ahead are received by said receive antenna, and information of a range relative to the vehicle running ahead is computed from a phase difference between the received radio waves of the two frequencies, and

said radar includes signal processing means for computing spectra of the radio waves of the two frequencies received by said radar, and when a part or the whole of at least one of the computed spectra is determined to have a

different waveform with the occurrence of any jamming, determining the at least one spectrum to be abnormal.

8. An automotive radio wave radar according to Claim 2, further comprising means for informing a driver of the fact that obstacle detection by said radar is disabled, when an interference occurs for plural center frequencies and received signals are all determined to be abnormal.

9. An automotive radio wave radar according to Claim 8, further comprising a display unit for providing visual display and/or a speaker for issuing a voice output to prompt the driver to pay attention.

10. A signal processing method for use in an automotive radio wave radar, comprising the steps of radiating a radio wave from a transmit antenna forward of a relevant vehicle, receiving a reflected radio wave from a vehicle running ahead or other object by a receive antenna, and computing a position or a rate of at least the vehicle running ahead relative to the relevant vehicle, wherein said method further comprises the steps of:

oscillating a radio wave to be transmitted while changing a frequency of the transmitted radio wave at a certain time interval; and

detecting an abnormality of a received signal based on signals obtained by receiving radio waves transmitted at different frequencies.

11. A signal processing method for use in an automotive radio wave radar according to Claim 10, wherein the method comprises the steps of:

radiating a radio wave modulated about a certain center frequency from said transmit antenna forward of the relevant vehicle while changing the center frequency to different frequencies at a certain time interval;

computing position information of the vehicle running ahead for each of the center frequencies of the transmitted radio waves;

executing decision by majority on the position information computed for at least three or more center frequencies; and

when mismatching position information is computed with the occurrence of any jamming, determining the position information, which has been decided to be minority with the decision by majority, to be an abnormal value and discarding the abnormal value.

12. A signal processing method for use in an automotive radio wave radar according to Claim 10, wherein the method comprises the steps of:

radiating a radio wave modulated about a certain center frequency from said transmit antenna forward of the relevant vehicle while changing the center frequency to different frequencies at a certain time interval;

computing spectra from intermediate frequency signals

resulting from down-converting received reflected radio waves by a mixer; and

when a part or the whole of at least one of the computed spectra is determined to have a different waveform with the occurrence of any jamming, determining the at least one spectrum to be abnormal and discarding the abnormal spectrum.

13. A signal processing method for use in an automotive radio wave radar according to Claim 10, the method comprising the steps of:

alternately radiating radio waves of two different frequencies forward of the relevant vehicle;

receiving reflected radio waves from the vehicle running ahead by said receive antenna; and

computing information of a range relative to the vehicle running ahead from a phase difference between the received radio waves of the two frequencies,

wherein the method further comprises the steps of:  
computing spectra of the radio waves of the two frequencies received by said radar; and

when a part or the whole of at least one of the computed spectra is determined to have a different waveform with the occurrence of any jamming, determining the at least one spectrum to be abnormal.

14. An automotive radio wave radar in which a radio wave is radiated from a transmit antenna forward of a

relevant vehicle, a reflected radio wave from a vehicle running ahead or other object is received by a receive antenna, and at least a position or a rate of the vehicle running ahead relative to the relevant vehicle is computed, said radar comprising:

oscillator for oscillating a radio wave to be transmitted while changing a frequency of the transmitted radio wave at a certain time interval; and

signal processor for detecting an abnormality of a received signal based on signals obtained by receiving radio waves transmitted at different frequencies.